9/1/01

UNIT WEIGHT OF CONCRETE AASHTO T 121

APPARATUS

- [ ] Measure, in accordance with AASHTO T 121 or the measuring bowl of an air meter
- [ ] Balance
  - [ ] M 231, Class G20
  - [ ] Range extends from weight of measure empty to weight of measure plus contents at 160 lb/ft^3
  - [ ] Readability, Sensitivity, and Accuracy of balance meets requirements of M 231 Class G 20 in field (see attached form)
- [ ] Tamping Rod
  - [ ] Round straight steel rod 5/8 in. in diameter
  - [ ] Approximately 24 in. in length
  - [ ] Tamping end rounded to hemispherical tip with diameter of 5/8 in.
- [ ] Internal Vibrator
  - [ ] Rigid or flexible shaft powered by electric motor
  - [ ] Minimum frequency of vibration of 7000 vibrations per minute
  - [ ] Outside diameter or side dimension at least 3/4 in. and not greater than 1 1/2 in.
  - [ ] Length of shaft at least 24 in.
- [ ] Strike-Off Plate
  - [ ] Flat rectangular metal plate at least 1/4 in. thick or a glass or acrylic plate at least 1/2 in. thick
  - [ ] Length and width at least 2 in. greater than diameter of measure
  - [ ] Edges straight and smooth within a tolerance of 1/16 in.
- [ ] Strike-Off Bar
  - [ ] Flat straight bar of steel or other suitable metal
  - [ ] At least 1/8 in. thick and 3/4 in. wide by 12 in. long
- [ ] Mallet
  - [ ] Rubber or rawhide head
  - [ ] Weight of 1.25 ± 0.50 lb for use with measures 0.5 ft^3 or smaller
  - [ ] Weight of 2.25 ± 0.50 lb for use with measures larger than 0.5 ft^3

PROCEDURE

[ ] Compaction method of concrete

1. Measures smaller than 0.4 ft^3 by rodding
2. Measures 0.4 ft^3 or larger the method as follows:

Slump	Method
> 3 in.	Rodding
1 to 3 in.	Rodding or Vibration
< 1 in.	Vibration

Note: For PCCP the compaction method for beams shall be by vibration

Rodding Method

[ ] Measure filled in three layers of approximately equal volume
[ ] Top layer filled to avoid overfilling
[ ] Each layer rodded 25 strokes when 0.5 ft^3 or smaller measures are used
[ ] Each layer rodded 50 strokes when 1 ft^3 or larger measure is used
[ ] Bottom layer rodded uniformly over the cross section of the measure and throughout its depth without rod forcibly striking the bottom of the measure
[ ] Second and top layer rodded throughout its depth, so that the strokes penetrate about 1 in. into the underlying layer
[ ] Measure tapped smartly 10 to 15 times with mallet after each layer is rodded
[ ] An excess of concrete is protruding approximately 1/8 in. above the top of the measure after rodding and tapping
[ ] Top surface struck off with plate or bar and finished smooth
  [ ] Plate pressed on top surface of measure covering two-thirds of surface and plate withdrawn with sawing motion
  [ ] Plate again placed over original two-thirds of surface and advanced with vertical pressure and sawing motion
  [ ] Several final strokes are made with edge of plate to produce smooth finished surface
[ ] Exterior of measure cleaned and measure weighed to obtain gross weight
[ ] Unit weight calculated as follows:

$$\text{Unit Weight, lb/ft}^3 = \frac{\text{Net Weight}}{\text{Volume of Measure}}$$

where:

Net Weight = gross weight minus the weight of the measure calculated to the nearest 0.01 lb
Volume of Measure, ft^3, as stated on calibration form

Vibration Method

[ ] Measure filled in two layers of approximately equal volume
[ ] All of concrete for each layer placed in measure before starting vibration
[ ] Vibrator inserted at three different points of each layer
[ ] Vibrator not resting on or touching the bottom or sides of measure when compacting bottom layer
[ ] Vibrator penetrates into the underlying layer approximately 1 in. when compacting top layer
[ ] Vibrator withdrawn in such manner that no air pockets are left in the concrete
[ ] Duration of vibration is such that the surface of the concrete is relatively smooth and proper consolidation is achieved, (overvibration may cause segregation and loss of appreciable quantities of intentionally entrained air)
[ ] An excess of concrete is protruding approximately 1/8 in. above the top of the measure after vibration
[ ] Top surface struck off with plate or bar and finished smooth
[ ] Exterior of measure cleaned and measure weighed to obtain gross weight
[ ] Unit weight calculated as follows:

$$\text{Unit Weight lb/ft}^3 = \frac{\text{Net Weight}}{\text{Volume of Measure}}$$

where:

Net Weight = gross weight minus the weight of the measure calculated to the nearest 0.01 lb

Volume of Measure, ft^3, as stated on calibration form

NA - Not Applicable
X - Requires Corrective Action
√ - Satisfactory

_____
Acceptance Technician

_____ _____
INDOT Date

Comments _____

_____

_____

FIELD VERIFICATION OF WEIGHING DEVICES USED IN THE TESTING OF CONCRETE

Type of Weighing Device

[ ] General Purpose Balance Direct-Reading Balance
[ ] General Purpose Balance Equal -Arm Balance
[ ] Scale

Manufacturer, Model No. & Serial No.

_____
_____

Readability (Smallest unit of weight that can be read)

[ ] 5 g or 0.005 kg

Sensitivity (Weight required to produce a change in reading)

[ ] 5 g or 0.005 kg

Accuracy (Maximum permissible deviation of reading from true value within applicable tolerances)

[ ] Range of use is identified as follows:
_____ kg through _____kg (_____ lbs through _____lbs)

[ ] Test Loads applied and readings confirm accuracy of 5 g or 0.1 percent of test load, whichever is greater, throughout range of use (see table below)

ACCURACY			
WEIGHT APPLIED (g)	INDICATION ON BALANCE (g)	WEIGHT DIFFERENCE (g)	PERCENT OF ERROR
3,500			
5,000			
10,000			
15,000			
20,000			

Remarks _____

_____

Verified by _____

Date: _____